MICROPROGRAMMING AND MICROPROCESSORS IN THE NETHERLANDS

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This paper gives a short survey of the activities in the field of microprocessors and microprogramming in the Netherlands. In the first part of it the activies within the Universities and non commercial institutes are mentioned. The second part deals with the industrial activity.
The author is aware of the incompleteness of the survey. The reason for it is twofold. First; Some of the activies, especially in the industrie, have confidential aspects. The information may not yet appear in a paper like this. Second; He is not aware of all activities carried out in the field. A list of names of the institutes etc and eventual contactpersons is included. A literature list is not added, because not much literature is available now.

Institutes (non commercial)

This part of the paper starts with the Technological University of Eindhoven.
This university has a great experience in microprocessor applications. All the soft- and hardware mentioned now is selfdevelopped around the Intel 8008 microprocessor and is available.
The software consist of a cross assembler on the IBM 360 and a simulator written in PL-1.
For the 8008 a complete set of double precision floating point routines is written. There is a software library with many application programs,i.e. in traffic control.
Hard-software interfacing is done for a paper tape reader, a paper tape punch, a card reader, a line printer, digital cassette recorders, a floppy disk (including suitable library control), a plotter, a TV display, a storage scope (with character and vector routines) and testing of Intel 1105 memory.
The hardware is build up in a modular system on EUROCARDS (100 x 160 mm) around the 8008. (Adaptation to 8080 or other microprocessors is simple). A universal traffic controller, and a 128 channel IO multiplexer are build.

Features for direct memory access, an external stack and automatic start-up routines are added to the 8008.
Software and hardware development for the Intel 8080 is in progress.

The Technological University of Delft is also using microprocessors. The first system built is a desk calculator based on Intel's 8008. The other applications use Intel's SIM8 cards. A braille editor is made, which translates data in ASCII-code to braille code. The system provides for many options to correct the final braille text. Other work is devoted now to a telex terminal to send measured data automatically to a host computer.
A display unit (Mini Bee) coupling to a CDC-STAR computer is worked out now. An off-line text editor is under development. A modular sysytem around the 8080 is to be build up. It contains CPU-cards, REPROM memory cards, RAM memory cards and IO cards (with 2 input, 2 output bytes and interrupt facilities). The cards are EUROCARDS with a 72 pins connector A 8080 cross assembler for an IBM 360 computer will be written in FORTRAN IV in cooperation with SARA (Stichting Academisch Rekencentrum Amsterdam).

The Technological University of Twente is more devoted to microprocessors -and microprogrammed- design from an architectural point of vieuw, then to microprocessor applications. Much attention is given to structured design. The description -and simulation techniques- use APL as a design language.
A number of general purpose microprocessors are designed and simulated in APL. The first of them is worked out in cooperation with Philips Elcoma Application Laboratory Eindhoven.
A description of Intel's 8080 in APL, which can be simulated in an interactive way is almost finished. A simple text editing system around the 8080 is in development.
Opportunities for microprocessors with specific functions to apply in data transmission control units are investigated. A design (in APL) for such a processor is started in cooperation with Philips Telecommunication Industrie in Hilversum.

In the microprogramming field an interactive system (in APL) is operational which fills micromemory.

It predicts micromemory dimensions for various microword formats if the control specification is given. Some APL aids are supplied to micromemory.

Among the other universities the work done at the medical faculty of the ERASMUS UNIVERSITY OF ROTTERDAM should be mentioned. Many clinical chemistry applications lend itself for automation. A number of applications are implemented now with SIM8-01 boards. Among them are: a specimen distribution system, a system to handle data from analysing devices. Automatic sorting of specimen and automatic labelling is done. A start is made now in automation of titration problems.
The Dutch PTT pays attention to microprocessors in its research and development lab. (dr Neher Laboratory) at Leidschendam. A terminal system is built around an Intellec-8 system. An interface card to the PDP8-E memory is available. Plans are worked out to use microcomputers (8080) in peripheral devices.

In the European Space Research and Technology Centre (ESTEC) in Noordwijk a lot of work has been done in the field of microprogrammable on board sattelite computers. Such a computer is built with Saab/Scania from Sweden.

Industries

Within Philips the Industrial Data Processing System Department of PIT Eindhoven delivers a MicroComputer Control System (MCCS). The system is set up around the 8008. It has a very modular combination of solid state RAM chips and REPROM chips. The system contains a central processor unit card and a variety of memory cards, input cards, interrupt option card, display-card and panel, a battery stand-by option and a card to IEC bus.
In the software items such as utility programs (cross assemblers for Philips computers), testprograms, standard arithmetic routines and interrupt handlers are programmed. An update of the system for the 8080 is in preparation. The MCCS is only available for intercompany use.

Philips Telecommunication Industry in Hilversum has a self designed microprocessor. The processor is made out of CMOS MSI and LSI circuits.It is especially meant for traffic control applications. In essence the processor is general purpose, but a number of control instructions are added to facilitate bit handling and testing. The processor contains registers, a stack, 16K memory capability and has an instruction set with 52 instructions. The micro-processor with memory and IO cards is expected to appear in marketted products within a few months. The use of Intel's 8008 or 8080 in house telephone installation are in consideration. Attention is paid to the application of specialized microprocessors in line controllers for communication purposes.

Philips Computer Industrie (Unidata) in Apeldoorn is using Intel's 8008 in synchronous data communication. Intel's 4004 is also been used in that field.

H.S.A. (Hollandse Signaal Apparaten)in Hengelo has its own microprogrammable control unit, with commercial available IC's in it. The machine has a 12 bit word format and is applicable in control applications Experimental adapters for a teletype, a paper tape punch and reader are finished. Non of the commercial microprocessors fullfills all of the requirements until now.

In process control Hoogovens (ESTEL) is using Intel's 8008 in simple applications for measurement devices. The idea here is to use microprocessors if the problem is too simple to use a PDP8 computer, but too complex to use hardwired logic. Normally the microprocessor operates on 1 fixed program and is built in in the measurement device.

AKZO in Arnhem uses Intel's 8008 also in real-time processing in the process industrie.

List of names and addresses;

AKZO,Arnhem, tel. 085-662159

Erasmus University of Rotterdam, tel.010-361000
(Ir.P.A.Mantel)

ESTEC, Domeinweg 1, Noordwijk, tel.01719-6555

HSA, Hengelo tel.05400-55850

Hoogovens, IJmuiden, tel.02510-99111

Philips PTI, Industrial Data Processing Systems
Department, Eindhoven tel.040-791111

Philips PTI, Hilversum tel.02150-99111

Philips PCI, Apeldoorn tel.05760-30123

P.T.T. Dr.Neher, Lab.Leidschendam tel.070-759111

Technological University of Delft tel.015-133222
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The contactpersons mentioned within the university are able to give you more information about the specific projects.